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Currency Recognition Using Image Processing

Currency Recognition

T.Vijaykanth Reddy¹

Assistant Professor, St. Peter's Engineering College,
Opposite TS Forest Academy Dullapally, Maisammaguda
Medchal, Hyderabad, Telangana 500043

Ragula Sai Teja³

B.Tech. 4th Year Students, Department of CSE,
Opposite TS Forest Academy Dullapally, Maisammaguda
Medchal, Hyderabad, Telangana 500043

Ruhina Begum²

B.Tech. 4th Year Students, Department of CSE,
Opposite TS Forest Academy Dullapally, Maisammaguda
Medchal, Hyderabad, Telangana 500043

Geddala Revanth⁴

B.Tech. 4th Year Students, Department of CSE,
Opposite TS Forest Academy Dullapally, Maisammaguda
Medchal, Hyderabad, Telangana 500043

Abstract— As there are many currencies in the world, Currency recognition has become huge problem for people, (mainly money exchange people). So our goal is to make it easy for the staff at Forex bank to identify the currencies of various countries around the world. To make it easy and efficient for the recognition of the note. We are using some machine learning techniques such as image processing. So with the help of this techniques, we can say the origin, denomination and currency name of various country currencies.

Keywords— *image processing, feature extraction, template matching, empty regions*

I.INTRODUCTION

Basis on the survey conducted by Central Intelligent Agency, there are approximately one eighty currencies circulating in the world .For example, the dimension of paper is different, the same as the pigment, pattern and texture. In this present times the business between countries has increased. The staff who work at Forex banks for money exchanging have to differentiate various types of currencies and that job is not that easy. They have to memorize the symbols of various currency. So, it is important to have knowledge about currencies. In whatever way, it is hard to remember and recognize the currency correctly by human. Here comes the challenge. So, to recognize the currency we need an efficient computerized and automated system.

We suggest a method which is an automated system for identification of currency using machine-learning (Image processing) techniques. There are many currencies. Some of them are Indian Rupee, American Dollar, Chinese yuan, Japanese yen, Sri Lanka Rupee. As we are working with notes they should be in proper refined manner, in order to provide usable input to the system

II.LITERATURE SURVEY

We have referred many papers regarding currency recognition system. In most of the cases they have implemented using classification algorithms like CNN, KNN, LBP, which are providing the results with the accuracy of 95.6%, 91%, 98%.

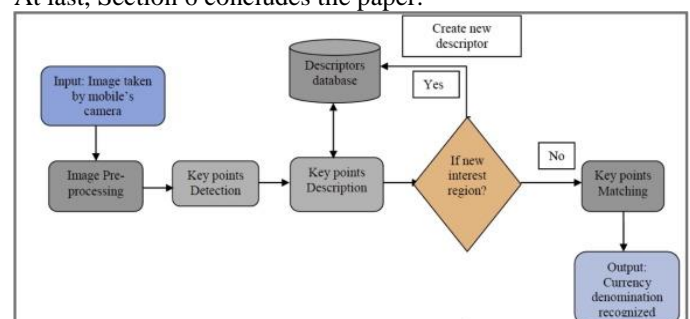
III. IMPLEMENTATION

A. Problem Statement:

As there are more than 180+ currencies all over the sphere. It is hard to identify and remember the currencies. People may remember for shorter time as time passes they may forget .So this may cause problems in businesses where people who deals with number of currencies. Hence we suggested a computerized method which accurately identifies name of the currency, origin and value of the note without any human interventions.

B. Process flow:

This paper is arranged as mentioned. Phase 2 handles with the preceding works done in the area of currency recognition. Phase 3 outlines the suggested techniques by describing the different techniques and variables fully. Phase 4 deals with implementation of the model and Phase 5 presents the results. At last, Section 6 concludes the paper.



C. Frame work:

All over the earth, there are many currencies available and the need for the automated system are interconnected with the currencies has been extremely growing. The system need to be developed in the process so that the currency note can be easily detected and recognize without the human intervention. Although there is a changes in the future of each note and the security features tangled in carious currencies make this task very critical. The systems that suggested in the past considered different features like aspect proportion and HSV merit. There were methods which utilizes a common algorithm for all the currencies that are available. In whatever way, even a single method has proved that the system was efficient for development hence making this issue as a fascinating zone for research.

The initial methods which identified the currency notes using image processing techniques in early 90's those methods don't consider the views of verification of the notes. Consequently, it has been presumed that the currencies are in correct state and images as desired are obtained. It is significant to indicate that suggested system necessary that it takes input images in a predetermined manner. The computer system presents a sequences of pre-processing phases on the input and produces fixed features like hue, saturation and merit variable in order to calculate a distance called Euclidean distance. With the help of these merits and compare the verified note merits with the standard values. Despite the fact that, this technique helps us to suggest a step-by-step procedure for the currencies of different countries, it is inefficient technique to recognize the currency notes that the countries which have related aspects.

In the paper [2] a technique was discussed where the system produces fixed aspects of the notes and estimates those features with the standard values which are in the sql table in order to recognize the currency. In whatever way, this technique considers a vast number of variables like dimensions of the currency and also performs certain techniques like edge detection (Canny) to get the other variables which helps to calculate the Euclidean distance.

The method discussed in paper [1] is used to determine the denomination and subsequently verify its validity. It uses the algorithm called linear binary pattern based on that it extracts certain features and verify the currency. It uses polarization properties to determine authenticity.

In the paper [3], This method uses Neural network algorithm where it finds certain features and uses the problem formulation of the Saudi PCR system

D. Prospective Methods:

In this we classified the process into two parameters

1. Identifies the name and origin of currency
2. Value of bank note

This approach has been explained briefly below,

In this firstly it takes the refined bank note as input. It undergoes certain pre-processing steps, where the superfluous noise or any clustered data is removed from the note using pre-filter(de-noising).After that the image is in the converted into white and black(binary image) format using adaptive thresholding. It is used to recognize the empty spaces on the currency.

Second phase in the method is, after extracting the empty regions those are segregated into different clusters. Generally we divided into 3 clusters they are left empty, central empty and right empty. If the features doesn't

belong to these three clusters we form those as other clusters. Then after we calculate the black pixels to white ratio we find the value of r . White and black pixels obtained in first step based on that we group them into clusters. Those empty regions are used to find the origin of the country by calculating black to white pixels ratio to find r value.

The third phase is, after finding the origin, we find the value of the note baes on empty regions Here we have approaches to find the value, they are

A.Ratio of Measurement

B. Pigment

C.Text clipping

A.Here depending on the dimensions like height width of the note we detect the value, but there will be some notes have same dimension for different currency. This is done by Euclidean distance.

B.Finding value using color or pigment is done by k-means algorithm, where it identifies the dominant colors from the notes. It uses LAB colors to do it. If we unable to find the value through size, we can easily find using color of the image.

C.if none of the above approaches work correct then it is definite that you can find using text method. In this method each currency has different text on the notes, by finding those text and comparing those with the standard templates we can find the value of the currency. Here templating is used.

IV. PROCESS FLOW

In this Method, we implemented it with by using some software's.

1. Python:

Python is a mostly used programming language these days which is interactive, interpreted and object oriented. It gives special importance to code legibility and makes the computer specialist tasks easy by writing code in a small number of lines.

2. Django Frame Work:

Django is a server-side Web frame work which is written in python. It takes care of much of the inconvenience caused by Web development, so developer can focus only on writing application without the need to reinvention the wheel.

3. MySQL:

MySQL is an open source relational database management system.A relational database organizes data into one or more data tables in which data types may be related to each other; these relations help structure the data. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database.

A.Results:

Country origin is identified by dividing into groups with the help of existence or non-existence of empty spaces. We Categorize the currency note by performing the template matching. After the pre-processing of the bank note, to identify the origin of country, template matching comparison takes place other country bank note. After the identification of the Country now, we will see for denomination or value of currency. The value of currency can be identified based on

color, size and text colors used to separate the various currencies and we can know the denomination easily. Size also differentiates currencies, so we can get to know what it is. We even use adaptive thresholding, it converts the image into black/white format.

B.Figures:

The GUI interface will look like this



Fig. 1. Example of a currency detecting using web portal

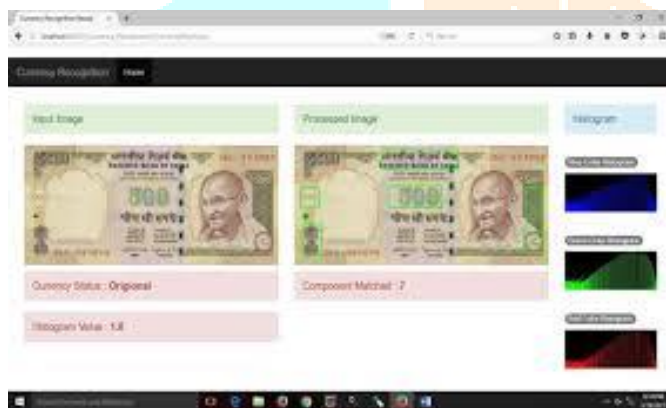


Fig. 2. Example of detection using country origin

V.CONCLUSION

Out of all this, our methodology has proven that it provided the most accurate results in finding the name, origin and value or denomination of the currency using image processing techniques with 93.3 % accuracy and within in less time i.e., average of 5.3 seconds. This is much better than some other crude algorithms like pixels to pixels. We have chosen only few currencies. In future we will progress it to maximum currencies.

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